

DEPARTMENT OF AGRICULTURE, OTTAWA

FARMERS' BULLETIN No.

HOG CHOLERA AND SWINE PLAGUE

AND

VERMINOUS BRONCHO-PNEUMONIA

BY

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FARMERS' BULLETIN.

HOG CHOLERA AND SWINE PLAGUE.

The growing importance of the swine industry in Canada, and the prospect of its rapid extension, more especially in Manitoba and the Territories, render it necessary that those now engaged in hog raising, and those about to commence this profitable branch of live-stock breeding, should be informed of the nature of their diseases and especially the measures necessary for the prevention of hog cholera and swine plague, two allied diseases which, in other countries, occasion enormous losses. It is estimated that in the State of Iowa alone, in a single year the losses amounted to from \$12,000,000 to \$15,000,000. They are preventable diseases, requiring only the exercise of common-sense precautions against the causes which operate in their dissemination. These I have endeavoured to outline in the following pages.

The Minister of Agriculture trusts that the farmers to whom this bulletin is addressed will read it carefully and preserve it for future reference, for their own and their neighbours' information.

HOG CHOLERA.

Hog cholera is extremely contagious and infectious. No other disease is more so; it can be conveyed to healthy swine in an endless number of ways, both by direct contact and intermediary agents, buildings, railways, platforms, wagons, crates, clothing, boots of attendants, &c. &c.

The pathogenic (disease producing) agent is the hog cholera bacillus. This bacillus has been demonstrated to possess different degrees of pathogenic power under different conditions, which are not always equally favourable for its development. Dr. Theobald Smith has shown, experimentally, that the bacilli become more pathogenic the oftener they are passed through the tissues of experiment animals, increasing in virulence up to the twelfth of the series. They will live in water from two to four months, and may remain alive and active in the soil from two to three months.

Our experience goes to support the result obtained by experiments. We know that when the disease first appears in a district it is often so mild, and the usual symptoms so undefined that it is difficult for even men of experience to recognize it as genuine hog cholera, hence we are not surprised to find not only farmers, but often veterinarians, also, protesting that in the absence of the usual text-book symptoms they cannot believe it to be genuine hog cholera.

From his experiments, Dr. Theobald Smith deduces the following conclusions:—

"(1.) The chief carriers of the infection are the swine themselves. This disease, having its chief seat in the intestines, a discharge of bacilli from the ulcers of chronic cases, or of such as have survived an attack, may take place long after the subsidence of an outbreak, or after they have changed hands. Infection may be thus carried over in the herd until a new susceptible generation of young pigs appears to continue the losses. Outbreaks occurring without any traceable importation of infection from without, are very probably due to latent infection in the herd itself.

"(2.) The custom prevailing in some parts of the country of not promptly removing the dead hogs, or of allowing them to be gnawed at or even partially consumed by the living, is a potent cause for the perpetuation and strengthening of the infective agent. In such cases, the bacilli consumed may cause mild, unrecognizable attacks, with discharge of bacilli from the bowels, subsequently.

"(3.) Preventative inoculation with living cultures may disseminate and perpetuate the disease, because the attenuated vaccinal cultures may regain their normal virulence in the bodies of swine after a certain lapse of time.

"(4.) The waves of epizootic which appear to sweep over the country at long intervals may be due to a sudden increase of virulence of the specific bacilli, after they have passed through the body of swine for some years.

"(5.) Pathogenic bacteria are always a menace, and no pains should be shunned to restrict their dissemination and multiplication in every way, by quarantine, by disinfection, and by the destruction of the dead with fire if possible."

HOG CHOLERA AND SWINE PLAGUE ARE DUE TO DIFFERENT BACILLI.

The two diseases, while distinct, are usually seen conjoined in an outbreak of hog cholera; in fact, Professor Welsh asserts that the bacilli of swine plague are always to be found in the throats of swine, but they remain inert, at least non-pathogenic, until the hog cholera bacillus, by its effect on the intestines induces that disease, when they become active, and descend in the air tubes, produce a pneumonic affection to which the name of swine plague has been given. The two diseases thus occurring in the same herd perplex the uninitiated and lead to divergencies of opinion.

SYMPTOMS.

The similarity of the symptoms with those of several other swine diseases, render it necessary that post mortems and bacteriological investigations be added to the clinical examination, before a reliable diagnosis can be made.

Thus, gastric and intestinal derangements from hotel swill and kitchen refuse feeding, lung and intestinal worms, swine plague, unsanitary housing, exposure to cold and damp will induce febrile conditions, bronchial irritation and other symptoms seen in hog cholera.

The common symptoms are: Increased temperature, which is variable; intolerance of cold, causing the animals to bury themselves in the litter, from which they are driven with reluctance; supersensitiveness of the skin, red blotches on the thighs, belly, neck and pubis; watering from the eyes, white at first, afterwards becoming purulent; staggering gait, sometimes a cough, which is aggravated when the animal is moved; short breathing, especially when there is also swine plague present; costiveness, followed by diarrhoea in the later stages; increasing debility, and, in young pigs, death after two days' illness.

The mortality is greatest in sucking pigs and shoats. In adult pigs, the symptoms are not well defined; in them it assumes a more chronic character. They usually have it in a mild form, appear to recover, but the peculiar button ulcers in intestines continue sometimes for years, rendering the excrement infective.

SYMPTOMS OF SWINE PLAGUE.

The general conditions found in both diseases are the same, the predisposing causes are identical. The bacterial study of them shows each to be due to its own special bacillus, that causing hog cholera being motile in liquids, whereas that causing swine plague is not motile in liquids; and Dr. Veranus A. Moore has shown that in hog cholera bacillus, from three to nine flagella are demonstrated, while no flagella have been found in that of swine plague. These bacilli will live in water from ten to fifteen days, and in soil from four to six days. The same general symptoms prevail in both, the

fever, chilliness, sensitiveness of the surface, redness of the ears, legs, belly and pubic regions. The cough is more marked, as is the difficulty of breathing, when the animals are caused to move. There is no diarrhoea, nor such marked debility or reeling gait incident to the disease.

Swine plague attacks young pigs more than adults, while the reverse is true of hog cholera. Practically, however, we find few outbreaks of the one in which the other is not more or less prevalent in the same herd, and often in the same animals, and the post mortem examination frequently reveals the intestinal ulcers and the bronchopneumonia, the solidification of one or more lobes of the lung which, in some cases, are adherent to the ribs or diaphragm by fibrinous effusion, and occasionally white fibrinous bands on the interlobular tissue give a portion of the lung a well-marked marbled appearance.

COMPLETE RECOVERY CAN SCARCELY EVER BE SAID TO OCCUR.

Even in very mild cases, on post-mortem examination, it is invariably found that ulceration of the intestinal coats has occurred, and although clearing has taken place to a considerable extent, the pathogenic bacilli will be found in the diseased part of the intestine.

Hence, it will be seen that so-called recovered swine are always dangerous.

The following extract from the report of the Departmental Committee of the Board of Agriculture of Great Britain, appointed to inquire into the etiology, pathology and morbid anatomy of swine fever, 1895, points to this chronic infective form as of frequent occurrence: "There are also, and always have been, many cases of the obscure chronic form of the disease, in which the morbid changes go on slowly for weeks and months, and finally attain an excessive state of development, without being attended by any of the symptoms which are usually accepted as diagnostic of swine fever.

Some very important information as to the obscure forms of swine fever was obtained by the committee by the examination of swine which had been isolated for a period of two months on infected premises; at the end of the time they had been certified to by a veterinary surgeon to be free from swine fever, and would, in the ordinary course have been released. In several of these instances, instead of being released, the swine were, at the request of the committee, slaughtered, and the organs sent for examination. In each set of specimens, characteristic lesions of swine fever were detected."

FEEDING HOGS ON HOTEL SWILL AND KITCHEN REFUSE.

Certain foods favour the pathogenic power of the bacilli. Hotel swill, although not necessarily producing hog cholera, may contain pork in one form or another, ham, bacon, or sausage, in which the bacilli are present, and may thus be the infecting medium.

The hotel swill barrel often contains soap, polishing pastes, and other chemicals and refuse, rendering the heterogeneous mixture poisonous and productive of disease, and by inducing gastric derangements facilitates the admission of the infecting bacilli into the circulation.

Most farmers keep a swill barrel in which sour milk and sour whey are collected. To this they add kitchen refuse and such serials as barley, oats, peas, corn, &c.; not unfrequently animal matter as well. This barrel is left exposed to the sun's heat, with a result that besides toxins and fermentative products, various forms of animal life are developed and, being introduced to the digestive organs, lead to various derangements of the stomach and intestines, presenting symptoms closely resembling swine fever, lacking only the contagious character and post mortem lesions.

VERMINOUS BRONCHO PNEUMONIA.

To such feeding as described can be traced the frequent occurrence of verminous broncho pneumonia, so common in badly-kept pigs, which is often mistaken for hog cholera or swine plague.

We frequently find minute thread worms in the bronchial tubes of pigs, and simultaneously in the intestines, the ova of which are taken into the stomach in such food as above described. The lung worms find the proper location for their development in the bronchial tubes, whence they are coughed up; other worms find a location in the stomach and intestines, whence the ova, escaping in the faeces, are again taken into the stomachs of other pigs; thus they pass from one to another, giving rise to the suspicion that the disease is hog cholera or swine plague, instead of verminous broncho pneumonia. This quite coincides with the observations of the Bureau of Animal Industry, report 1895 to 1896, page 174: "In many instances pigs die from disease brought on directly by improper feeding, and any disease germs found in one or more of such animals by bacteriological methods may have no direct relation to the disease."

"We may thus have, on the one hand, outbreaks due directly to pathogenic bacteria of a high grade of virulence; on the other, we may have outbreaks due to food unfit to nourish the animal, or containing toxic substances. We may also have death due to a combination of these two causes, the one or the other predominating, as the case may be. It is probable from our experience that outbreaks of swine diseases due to the virulence of bacteria alone are rare, and that therefore much prevailing disease may be prevented by attention to the physiological laws governing the body."

ERRORS IN FEEDING.

If swine feeders would but consider that the stomach and intestines of the pig resemble very closely their own, and imagine the household being forced to eat that which they give to the pigs, from a delicate little suckling pig to the fat hog, they might expect their families, young and old, to be attacked by severe gastric and intestinal derangement.

I would strongly urge that the agricultural-boiler be brought more into use by the swine raiser and feeder. Boiling food would at least insure freedom from disease germs and worms.

Great improvements can be made in the manner of feeding corn to hogs. Too often the surplus corn is rooted out of the trough, if such is used, and trampled into the mire, where it undergoes fermentative changes and when afterwards eaten produces gastric and intestinal disturbance. This could be prevented by placing the trough on slatted platforms, made of such a size as would admit of their being moved easily, when necessary for sanitary or other reasons.

The management of hogs requires the application of common-sense in the housing and feeding, as does the management of the other domestic animals.

Buyers of pork would do well to refuse to purchase it unless they know that the pigs were fed on wholesome food, and kept in sanitary surroundings.

HOG CHOLERA AND SWINE PLAGUE ARE COMMUNICATED FROM ONE HERD TO ANOTHER.

1st.—By *direct communication*, by introducing infective pigs into herds, by sending sows to be bred from one farm to another, and from the infective intestinal discharges of so-called recovered sows or boars.

2nd.—By *mediate communication*, by people conveying the infection in their clothing, on their boots, on any utensils or implements, crates, wagons, lumber or fodder, by dogs, carrion birds and, among close neighbours, by rats or other vermin. By infective yards, platforms, railway cars, or anything with which diseased animals have come in contact.

During our investigations in western Ontario we have repeatedly observed that this disease spreads rapidly along the banks of a river, due, no doubt, to the practice of getting rid of carcases by throwing them into the water. This, we have noticed, in large as well as small streams.

BEWARE OF EMPIRICAL CURES.

In one section of Ontario, much loss has been entailed by quacks selling nostrums, reported to cure the disease. Farmers, as a rule, as too easily imposed upon in this way. Believing in the efficacy of these quack medicines, they commit a serious breach of quarantine regulations in failing to report to the Government the existence of contagious disease in their stock; they often allow the disease to attack their entire herd and, by disposing of partially recovered pigs to neighbours, they spread the disease and cause serious loss to others.

A careful consideration of what is said above as to the ineffectiveness of so-called recovered pigs will impress all thinking men of the danger arising from keeping such alive longer than to fatten them for slaughter; such should never be sold for removal into any man's herd, even to one's worst enemy, as it may lead to his ruin. *Farmers, think of this.*

PREVENTIVE MEASURES.

Every breeder or feeder of pigs ought to arrange his premises so that he can divide them into perfectly isolated piggeries, so that if, by some misfortune, disease is introduced to one lot, the others may be preserved, through isolation. Breeders and owners would greatly serve their own interests by providing a separate pen as a quarantine pen for probationary detention of all new purchases, in which they would be kept for a few weeks to make sure that they are free from disease.

When the disease has been introduced and discovered in a herd, immediate notice should be given to the Minister of Agriculture, who will cause an investigation to be made, and if the disease is found to be hog cholera, quarantine will be established, the actually diseased pigs immediately slaughtered and the carcasses burned, or deeply buried with lime; all fat enough will be immediately slaughtered and if, on post mortem examination, they are found free from the disease, they will be sold for pork, and the balance fattened as quickly as possible and disposed of if, on examination after death, the flesh is considered fit for food; indemnity being paid for those actually diseased, to the extent of one-third of their value before they became diseased. For animals in contact, the compensation is three-quarters of their value. Every pig on the farm must be killed and the premises thoroughly disinfected before an inspector can issue an indemnity certificate, which must be accompanied by certificates of satisfactory disinfection; thereafter the Minister will order the removal of the quarantine.

CLEANSING DIRECTIONS.

The flooring, divisions and base boards of the pen should be removed and any loose boards with which the hogs have come in contact, burned; the surface earth or gravel of the pens and yards should be removed to a depth of six inches, freely covered with newly-slacked lime and re-covered with fresh earth or gravel.

The disposal of manure from infected hog pens is seldom sufficiently considered, yet manure is a frequent source of infection. As above stated, the bacilli of swine plague will live in the water from 10 to 15 days, and in soil four to six days; that of hog cholera lives in water two to four months and in soil from two to three months; and in manure they live for an indefinite period, varying according with the season. During the prevalence of these diseases, the manure should be carefully collected from the piggeries and at once mixed with newly-slacked lime, and removed in water-tight wagon boxes to an inclosed yard to which none of the animals on the farms have access. This is the more necessary on account of the impossibility of disinfecting a barn-yard or manure pile during winter weather, or so long as frost continues. When used, it should be ploughed in, not spread as a top dressing. The careless custom of throwing it into a common pile in the barn yard, over which all classes of stock root and trample it down, is one of the means by which the disease is perpetuated and extended.

The bacilli adhere to the hair of the legs of horses and cattle, and by them are conveyed to the streams or rivers at which they drink, rendering the water infective to pigs miles distant.

Sick pigs, if allowed to roam in the barn-yard, under buildings, and to root into stacks of hay or straw, render complete disinfection impossible.

Piggeries should have independent yards, which should be large, with a gentle southerly slope and exposure, and they should be placed at some distance from the barn-yard.

Orchards, or small-sized fields, should be ploughed after being freely covered with lime.

Lanes and fences should be cleaned in the same manner as the yard, the ground rails of the fences should be burned.

The clothing of all persons who have been attending to, or engaged in killing and burning the hogs, should be boiled, and their boots thoroughly cleaned and soaked in a solution of carbolic acid, 1 to 30 of water. The pens, building, fences and other permanent structures with which diseased pigs have come in contact should, when possible, be thoroughly doused with steam or boiling water, scrubbed with a rough brush, and then given a coating of lime wash, to every five gallons of which a pound of commercial carbolic acid has been added. By aid of a spraying pump, cracks and corners may be reached better than by the brush. To be effective, it requires to be done most thoroughly. After cleansing and disinfection, expose the premises to sunlight and air freely for about three months before placing pigs in them again. By some authorities, corrosive sublimate solution, carbolic acid and sulphuric acid, and other chemical disinfectants are recommended. We find the above cheap and easily procurable formula equally effective and more readily made use of by the public.

The following extract made from the report of Mr. M. B. Perdue, V.S., Kingsville, Essex, which has hitherto been the most infected district in the western peninsula, shows the success of the plan followed by the veterinary staff in dealing with hog cholera. He says: "While the disease is highly contagious, it has been effectually stamped out wherever found, by the present method of dealing with it. In no case during the year where premises have been disinfected and released from quarantine have I found a second outbreak among hogs afterwards kept there."

The same can be said for the province of Quebec (Annual Report, 1898).

Visiting should be curtailed as much as possible, while the disease exists and till the cleaning has been completed as the disease can be carried on the boots. Horses or dogs from neighbouring farms may carry infection to other farms and should therefore be prohibited from entering the premises.

Inspectors should put up notices of infection at the gates leading to farms where the disease exists.

When it is widespread in a district, the district should be close-quarantined and movement of pigs stopped till all infected farms have been placed under control.

There is no other contagious disease of domestic animals that requires, for its eradication, so much persistent co-operation between the owners and the Government veterinary inspectors—whoever trifles with it may as well play with fire among his hay stacks—he is certain to injure himself and very likely to damage his neighbour.

HOW PIGS MAY BE KEPT HEALTHY.

There are no farm animals that can be made to yield as large a profit as well-managed pigs—none that will so readily respond to efforts at improvement. In breeding and feeding—on the other hand, none degenerate so rapidly under a system of neglect and mismanagement. They require warm, dry sleeping places; damp, cold, unsanitary pens are ruinous to the health of pigs. They are the better of exercise in an open straw yard—but they should have a dry, warm, well-lighted pen, with a southern exposure, to retire to. Their food should be sound and sweet, and given at regular intervals. The troughs should be kept perfectly clean by frequent washings. The pens should be cleaned out regularly, as those of cattle or horses.

They should be so constructed that water can be freely employed in washing them out. Thirty per cent creolin solutions should be frequently sprayed over the entire pen.

The young pigs and shoats should be dipped every two weeks in a 10 per cent solution of creolin in tepid water, a barrel of which should be kept in a convenient place. The removal, by this means, of numerous parasites, will greatly relieve the pigs of skin irritation. It will be found that they will thrive much better where this is practised.

The improved sanitation will lessen the tendency to verminous infection, by destroying the ova which, in cold damp, undrained, consequently unhealthy, corners of underground buildings usually abound.

As treatment of verminous broncho pneumonia by the administration of vermifuge medicines, where large numbers of pigs of all ages are kept is very difficult of administration, owners should do what they can to prevent infection. Spirits of turpentine, in doses varying from 15 drops, in little pigs, to a dessertspoonful in large ones, given in milk well shaken up, twice daily, will be beneficial, especially for intestinal worms. Pine balsam, or resin, may be given mixed in their food—or powdered areca nut, four grains for every pound of the animal's weight, in young pigs; in adults, 2 to 3 drachms daily. It is best given in milk, on an empty stomach.

For the lung worm affection, turpentine given internally and inhalation of its fumes by burning it on pine shavings, or evaporating it with a spirit lamp in a closed compartment into which the pigs are driven and allowed to remain for a few minutes only, depending on the amount of bronchial irritation produced by the fumes, will destroy the worms and cause them to be coughed up.

This treatment requires great care and judgment to avoid accidents, and if the fumes are strong, it may be sufficient to merely drive the pigs through the compartment.

In this, as in hog cholera and swine plague, "prevention is better than cure."

At all seasons of the year, pigs will be benefited by having fresh sods placed in a corner of their pen for them to root among.

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Chief Veterinary Inspector for Canada.